

# Exhibit 2

**Exhibit G - U.S. Patent No. 9,198,042 (“’042 Patent”)**

Accused Instrumentalities: smartphones, basic phones, tablets, laptops, and hotspot devices sold (including those sold in bundles with data plans) or used by Verizon in conjunction with Verizon’s servers, hardware, software, and services leased, owned, supported, and/or operated by Verizon comprising Verizon’s wireless network services, and all versions and variations thereof since the issuance of the asserted patent.

**Claim 1**

| Issued Claim(s)  | Public Documentation   |
|--|--|
| 1. A method comprising:  | To the extent the preamble is limiting, Verizon’s Accused Instrumentalities practice the steps of a method as set forth in the limitations below.  |
| [1a] receiving, over a service control link, a report from a wireless end-user device, the report comprising information about a device service state; | The Accused Instrumentalities comprise receiving, over a service control link, a report from a wireless end-user device, the report comprising information about a device service state. Verizon offers telecommunications service plans to customers that are provided through various network elements such as telecommunications base stations and cell sites, edge servers, and other telecommunications servers. Verizon provides various network service plans to customers for purchase, including through the Verizon.com website as well as through Verizon-provided services such as its pre-paid mobile service category, Total By Verizon. <i>See, e.g.:</i> |

Best Value: Eligible for our best new phone offers

If you love movies,  
series & more.

**\$100/mo\***  
Save \$39.99/mo

Unlimited Plus

- 5G Ultra Wideband
- 30 GB premium mobile hotspot data\*\*

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Perk  
Disney Bundle >

Perk  
100 GB Mobile  
Hotspot >

By continuing, you agree to selected perk [Terms & Conditions.](#)

Select Customize

hulu Disney+ ESPN+

✓

<https://www.verizon.com/sales/digital/plans/popularplan.html?line=newLine1&mtnFlow=P>

The screenshot displays the Verizon Total by Verizon website with the following navigation links: Shop, Refill, Activate, Why Total by Verizon, Login, Rewards, and a search icon. The main content area features four plan cards:

- 5 GB Plan**: \$30/line per month, 1.3 (4) stars. Features include unlimited talk & text, 5 GB data at high speed, hotspot up to 5 GB, and international service to Canada & Mexico. Includes a 5% off with Auto-Refill™ discount.
- 15 GB Plan**: \$40/line per month, 0.0 (0) stars. Features include unlimited talk & text, 15 GB data at high speed, hotspot up to 15 GB, and international service to Canada & Mexico. Includes a 5% off with Auto-Refill™ discount.
- Unlimited**: \$50/line per month, 5.0 (1) stars. Features include unlimited talk, text & data, 10 GB hotspot, unlimited talk & text to 5 countries, Verizon's 5G network, and a no-contract monthly plan. Includes a 5% off with Auto-Refill™ discount and a 6-month Disney+ promo.
- Unlimited+**: \$60/line per month, 5.0 (1) stars. Features include unlimited talk, text & data, 20 GB hotspot, unlimited talk & text to 69 countries, Verizon's 5G network, 5G Ultra Wideband access, and a no-contract monthly plan. Includes a 5% off with Auto-Refill™ discount and a 6-month Disney+ promo.

Each plan card has a 'See plan details' button and a 'Compare' checkbox at the bottom.

<https://www.totalbyverizon.com/plans>

Verizon sells mobile devices such as phones, tablets, and hotspot access points which communicate with the Verizon wireless service network, which is a wireless access network. Such devices comprise end-user devices, as do devices which customers purchase elsewhere and “bring” to the Verizon network. *See, e.g.:*



AllFree phonesSamsungAppleMotorolaGoogleKyocera

Lowest price with trade-in offer

100 results

Sort by: Best Sellers

Filter


Brand

OS

Special Offers

In Store Pickup


Price



**Apple iPhone 14**  
Starts at \$22.22/mo  
for 36 months, 0% APR  
Retail price: \$799.99


☐ Compare

2.5K



**Apple iPhone 14 Pro Max**  
Starts at \$30.55/mo  
for 36 months, 0% APR  
Retail price: \$1099.99

☐ Compare



**Bring your own phone and get \$540.**  
With Unlimited Plus plan. [Details](#)  
**Learn more >**

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Filter

Brand

OS

Special Offers


In Store Pickup

Price

Condition


Availability


Color



**Samsung Galaxy S23 Ultra**


Starts at \$33.33/mo  
for 36 months, 0% APR  
Retail price: \$1199.99


☐ Compare
 



**Apple iPhone 14 Plus**


Starts at \$5.00/mo  
~~\$24.99/mo~~ Details  
for 36 months, 0% APR  
Retail price: \$899.99


☐ Compare
 




**Samsung Galaxy S21 FE 5G**


Starts at \$0/mo  
~~\$16.66/mo~~ Details  
for 36 months, 0% APR  
Retail price: \$599.99

☐ Compare
 






Get it free.




<https://www.verizon.com/smartphones/?sort=best-sellers>


## Shop Hotspots and Internet Devices

6 results **Sort by:** Featured ▾




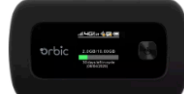
**Inseego MiFi X PRO 5G UW**  
★★★★☆ (304)  
Starts at \$9.72/mo for 36 months, 0% APR  
Retail price: \$349.99

☐ Compare 





**TCL LINKZONE 5G UW**  
★★★★☆ (79)  
Starts at \$8.33/mo for 36 months, 0% APR  
Retail price: \$299.99

☐ Compare 



**Verizon Orbic Speed Mobile Hotspot**  
★★★★☆ (638)  
Starts at \$2.22/mo for 36 months, 0% APR  
Retail price: \$79.99

☐ Compare 




**Already have a device you love?**  
Bring your own device to America's most reliable network. [Details](#)

**Learn more >**


<https://www.verizon.com/internet-devices/>

The Accused Instrumentalities use different service plans to provide service, for example, to mobile hotspot devices, mobile phones and tablets provisioned with an “unlimited” data plan, mobile phones and tablets provisioned with a prepaid plan, mobile phones and tablets which for which the associated subscriber account has reached its allotted data limit for the service period, and mobile phones and tablets which are specifically communicating with Verizon servers to purchase or increase data allotments (e.g., a Verizon “Data Boost”).

*See, e.g.:*



[Shop](#) [Why Verizon](#) [Support](#)

[Sign in](#) 

Have a phone you love? Get \$540 when you [bring your phone](#).

Premium Streaming

[Overview](#) [Features](#) [Pricing](#) [Support](#)

[Get it now](#)

Premium Streaming

Monthly Pricing

\$10 per line

[Get it now](#)

✔ Improves video quality

✔ Cast to large screens

✔ Use on most devices

New to Verizon?

Verizon Unlimited Plans give you the best in entertainment and security with unlimited talk, text and data.

[Learn more](#)

<https://www.verizon.com/solutions-and-services/add-ons/entertainment/premium-streaming/#pricing>

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✓

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Sign In

Search

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# Data Boost FAQs

Learn what a Data Boost is, how your mobile data plan uses Data Boosts, what a Data Boost costs and how to get one.

- [How much does a data boost cost, and how much data do I get?](#)
- [How do I buy a data boost?](#)

## About Data Boosts

[Expand All](#)

### 1. What's a Data Boost?

A Data Boost is extra high-speed data the [Account Owner](#) or [Account Manager](#) can buy in My Verizon to help the account's lines avoid slower connection speeds.

Introduce

About Da

Using Da

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Have a phone you love? Get \$540 when you bring your phone. ⓘ

How the Data Boost is used depends on your plan:

| Your plan  | What buying a Data Boost does   |
|--|---|
| Unlimited Plus and most previously-available Unlimited mobile phone plans.                                     | When you add a 5 GB Data Boost to a line on your account, Mobile Hotspot 4G LTE / 5G ⓘ speed resumes for that line. When you go over your plan's data allowance, your general device use and Mobile Hotspot data may still be temporarily slower than other traffic in times of congestion. |
| Unlimited Welcome  | Data Boosts aren't available unless you first buy the \$10/month 100 GB Mobile Hotspot perk*. You can then add a data boost to that perk if needed.   |
| Go Unlimited**   | Data Boosts aren't available.   |
| Shared Data Plan – 5GB**, Shared Data Plan – 10GB**, The new Verizon Plan (shared data plans, e.g., S, M, L)** | Buy a Data Boost to add 1 GB of 4G LTE / 5G ⓘ data for the account's general device use, including Mobile Hotspot.  |
| Unlimited Plus and Essential, Plus, Pro & Premium plans for mobile hotspot devices                             | Buy a Data Boost to add 5 GB more of 4G LTE / 5G ⓘ / 5G Ultra Wideband ⓘ data to your mobile hotspot device.  |
| Prepaid monthly phone plans***   | You can buy more high speed data for your general device use, including Mobile Hotspot.   |

Introduction

About Data Boosts

Using Data Boosts

Was this helpful? ⓘ

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Shop

Why Verizon

Support

Sign in

Search

Have a phone you love? Get \$540 when you [bring your phone](#).

3. Does my Data Boost expire at the end of the month?

The Data Boost's expiration date depends on the plan you have:

- Unlimited plans - Your Data Boost expires at the end of your current bill cycle.
- Shared data plans\* - Any unused portion of your Data Boost is added to your pool of [Carryover Data](#) and expires at the end of the next bill cycle (e.g., a Data Boost bought during your June bill cycle expires at the end of your July bill cycle).
- Eligible prepaid plans - The expiration date is determined by the size of the Data Boost and the date of purchase:
  - 500 MB Data Boost expires after 30 days
  - 1 GB or 3 GB Data Boost expires after 90 days

To see your bill cycle dates, open [My Verizon](#) or the My Verizon app and choose Bill from the top menu.

Data Boosts aren't available on Unlimited Welcome, Welcome Unlimited, Just Kids\*, Go Unlimited\*, prepaid unlimited plans and current prepaid data only plans.

\*These plans are no longer available to add to your account.

<https://www.verizon.com/support/data-boost-faqs/>

Verizon's network receives service plan information from devices which correspond to the subscriber service plan associated with that wireless end-user device, which is a report comprising information about a device service state. For example, Verizon's network receives an attach request, bearer resource allocation request, bearer resource modification request, or PDN connectivity request from a wireless end-user device (UE), which includes a report comprising information about the UE's service state such as UE network capability, UE status, and protocol configuration options (PCO):

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Table 8.2.4.1: ATTACH REQUEST message content

| IEI | Information Element                            | Type/Reference   | Presence | Format | Length |
|-----|--|--|----------|--------|--------|
|     | Protocol discriminator                         | Protocol discriminator<br>9.2                              | M        | V      | 1/2    |
|     | Security header type                           | Security header type<br>9.3.1                              | M        | V      | 1/2    |
|     | Attach request message identity                | Message type<br>9.8  | M        | V      | 1      |
|     | EPS attach type                                | EPS attach type<br>9.9.3.11                                | M        | V      | 1/2    |
|     | NAS key set identifier                         | NAS key set identifier<br>9.9.3.21                         | M        | V      | 1/2    |
|     | EPS mobile identity                            | EPS mobile identity<br>9.9.3.12                            | M        | LV     | 5-12   |
|     | UE network capability                          | UE network capability<br>9.9.3.34                          | M        | LV     | 3-14   |
|     | ESM message container                          | ESM message container<br>9.9.3.15                          | M        | LV-E   | 5-n    |
| 19  | Old P-TMSI signature                           | P-TMSI signature<br>9.9.3.26                               | O        | TV     | 4      |
| 50  | Additional GUTI                                | EPS mobile identity<br>9.9.3.12                            | O        | TLV    | 13     |
| 52  | Last visited registered TAI                    | Tracking area identity<br>9.9.3.32                         | O        | TV     | 6      |
| 5C  | DRX parameter                                  | DRX parameter<br>9.9.3.8                                   | O        | TV     | 3      |
| 31  | MS network capability                          | MS network capability<br>9.9.3.20                          | O        | TLV    | 4-10   |
| 13  | Old location area identification               | Location area identification<br>9.9.2.2                    | O        | TV     | 6      |
| 9-  | TMSI status                                    | TMSI status<br>9.9.3.31                                    | O        | TV     | 1      |
| 11  | Mobile station classmark 2                     | Mobile station classmark 2<br>9.9.2.4                      | O        | TLV    | 5      |
| 20  | Mobile station classmark 3                     | Mobile station classmark 3<br>9.9.2.5                      | O        | TLV    | 2-34   |
| 40  | Supported Codecs                               | Supported Codec List<br>9.9.2.10                           | O        | TLV    | 5-n    |
| F-  | Additional update type                         | Additional update type<br>9.9.3.0B                         | O        | TV     | 1      |
| 5D  | Voice domain preference and UE's usage setting | Voice domain preference and UE's usage setting<br>9.9.3.44 | O        | TLV    | 3      |
| D-  | Device properties                              | Device properties<br>9.9.2.0A                              | O        | TV     | 1      |
| E-  | Old GUTI type                                  | GUTI type<br>9.9.3.45                                      | O        | TV     | 1      |
| C-  | MS network feature support                     | MS network feature support<br>9.9.3.20A                    | O        | TV     | 1      |
| 10  | TMSI based NRI container                       | Network resource identifier container<br>9.9.3.24A         | O        | TLV    | 4      |
| 6A  | T3324 value                                    | GPRS timer 2<br>9.9.3.16A                                  | O        | TLV    | 3      |
| 5E  | T3412 extended value                           | GPRS timer 3<br>9.9.3.16B                                  | O        | TLV    | 3      |
| 6E  | Extended DRX parameters                        | Extended DRX parameters<br>9.9.3.46                        | O        | TLV    | 3      |
| 6F  | UE additional security capability              | UE additional security capability<br>9.9.3.53              | O        | TLV    | 6      |
| 6D  | UE status                                      | UE status<br>9.9.3.54                                      | O        | TLV    | 3      |
| 17  | Additional information requested               | Additional information requested<br>9.9.3.55               | O        | TV     | 2      |



**Table 8.3.8.1: BEARER RESOURCE ALLOCATION REQUEST message content**

| IEI | Information Element                                 | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                              | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                 | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                      | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource allocation request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | Linked EPS bearer identity                          | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                    | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                              | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
|     | Required traffic flow QoS                           | EPS quality of service<br>9.9.4.3                   | M        | LV     | 2-14    |
| 27  | Protocol configuration options                      | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                   | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                    | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 7B  | Extended protocol configuration options             | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                    | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

**Table 8.3.10.1: BEARER RESOURCE MODIFICATION REQUEST message content**

| IEI | Information Element                                   | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                                | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                   | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                        | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource modification request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | EPS bearer identity for packet filter                 | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                      | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                                | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
| 5B  | Required traffic flow QoS                             | EPS quality of service<br>9.9.4.3                   | O        | TLV    | 3-15    |
| 58  | ESM cause   | ESM cause<br>9.9.4.4                                | O        | TV     | 2       |
| 27  | Protocol configuration options                        | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                     | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                      | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 66  | Header compression configuration                      | Header compression configuration<br>9.9.4.22        | O        | TLV    | 5-257   |
| 7B  | Extended protocol configuration options               | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                      | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

Table 8.3.20.1: PDN CONNECTIVITY REQUEST message content

| IEI | Information Element                       | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                    | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                       | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity            | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | PDN connectivity request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | Request type                              | Request type<br>9.9.4.14                            | M        | V      | 1/2     |
|     | PDN type                                  | PDN type<br>9.9.4.10                                | M        | V      | 1/2     |
| D-  | ESM information transfer flag             | ESM information transfer flag<br>9.9.4.5            | O        | TV     | 1       |
| 28  | Access point name                         | Access point name<br>9.9.4.1                        | O        | TLV    | 3-102   |
| 27  | Protocol configuration options            | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                         | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                          | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 66  | Header compression configuration          | Header compression configuration<br>9.9.4.22        | O        | TLV    | 5-257   |
| 7B  | Extended protocol configuration options   | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |

3GPP TS 24.301 v15.03

## Flows

There are three scenarios where the PCO value will be passed to the host:

- When a new PCO value has arrived on an activated connection
- When an app or service queries for the latest PCO value from the modem
- When a connection is bridged or activated for the first time and a PCO value already exists in the modem

For the first scenario, the modem should send an [NDIS\\_STATUS\\_WWAN\\_PCO\\_STATUS](#) notification to the OS indicating a new PCO value change whenever a new PCO value is received from the network, with the appropriate NDIS port number to represent the corresponding PDN. To avoid draining the battery unnecessarily, the modem should avoid noisy notifications, as described in [Modem behavior with Selective Suspend and Connected Standby](#).


For the second scenario, when an app or service queries for PCO value from the modem on an activated PDN connection, the host will send the modem an [OID\\_WWAN\\_PCO](#) query request to read the latest cached PCO value in the modem.

For the third scenario, when a connection is activated or bridged on the host, the modem should send an [NDIS\\_STATUS\\_WWAN\\_PCO\\_STATUS](#) notification when a PCO value already exists in the modem for the activated or bridged connection the host requested. The notification should be passed up from the corresponding NDIS port number of the PDN.



|  |  |
|--|--|
|  | <a href="https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations">https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations</a>  |
| <p>[1b] determining, based on the report, that a particular service policy setting of the wireless end-user device needs to be modified, the particular service policy setting being stored in a protected partition of the wireless end-user device, the protected partition configured to deter or prevent unauthorized modifications to the particular service policy setting, the particular service policy setting being associated with a service profile that provides for access by the wireless end-user device to a network data service over a wireless access network, the particular service policy setting configured to assist in controlling one or more communications associated with the wireless end-user device over the wireless access network; and</p> | <p>The Accused Instrumentalities comprise “determining, based on the report, that a particular service policy setting of the wireless end-user device needs to be modified, the particular service policy setting being stored in a protected partition of the wireless end-user device, the protected partition configured to deter or prevent unauthorized modifications to the particular service policy setting, the particular service policy setting being associated with a service profile that provides for access by the wireless end-user device to a network data service over a wireless access network, the particular service policy setting configured to assist in controlling one or more communications associated with the wireless end-user device over the wireless access network.”</p> <p>Examples of such service policy settings on the wireless end-user device include, for example, APN access settings and service plan settings stored on the wireless end-user device, including for example in an encrypted partition of the device or in an encrypted SIM card. Such service policy settings are configured to assist in controlling one or more communications associated with the wireless end-user device over the wireless access network, insofar as the policies are used by Verizon to determine the levels of service that are to be provided to the wireless end-user device.</p> <p>Carrier configuration information (which is service profile information) on a given wireless end-user device is secured within the device through the use of privileges and other access settings, including through the use of matching signatures between the carrier settings and one stored with the SIM card information. <i>See, e.g.</i>: <a href="https://www.verizon.com/support/knowledge-base-212894/">https://www.verizon.com/support/knowledge-base-212894/</a></p> |

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[Support](#) > [Apple](#) > [Apple iPhone 6](#)

# Apple iPhone - Update Carrier Settings

Was this helpful?

NOTE

- Carrier settings updates are small files that are installed on iOS devices. The carrier settings include updates to Access Point Names (APNs), MMS settings, features like tethering and default apps. Having the most up to date carrier settings is recommended for the proper functionality of the device.
- Apple® Watch® Series 3 users must be on Carrier Bundle 29.1 or higher (check on your iPhone® via **Settings** • **General** • **About** • **Carrier**). For more info on how to check carrier and / or update your Carrier version, refer to Updating Your Carrier Settings

1. From a Home screen on your **Settings**  • **General**  
→ If unavailable, swipe left to access the App Library.  
→ If a carrier settings update is available, you're presented with an option to update.

2. Tap **About**.  
→ If an update is available, an option appears to update.  
→ To view the current carrier info, refer to [View Carrier](#).

<https://source.android.com/docs/core/connect/carrier>

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## Carrier Configuration

Android 6.0 and higher include a capability for privileged apps to provide carrier-specific configuration to the platform. This functionality, based on the [UICC Carrier Privileges](#) introduced in Android 5.1 (Lollipop MR1), allows carrier configuration to be moved away from the static configuration overlays and gives carriers and OEMs the ability to dynamically provide carrier configuration to the platform through a defined interface.

A properly signed carrier app can either be preloaded in the system image, installed automatically, or manually installed through an app store. The app is queried by the platform to provide configuration for settings including:

- Roaming/nonroaming networks
- Visual voicemail
- SMS/MMS network settings
- VoLTE/IMS configurations

★ **Note:** This app must be signed with the certificate that has a matching signature to one on the SIM. See [How is privilege granted to a carrier app](#) for details.

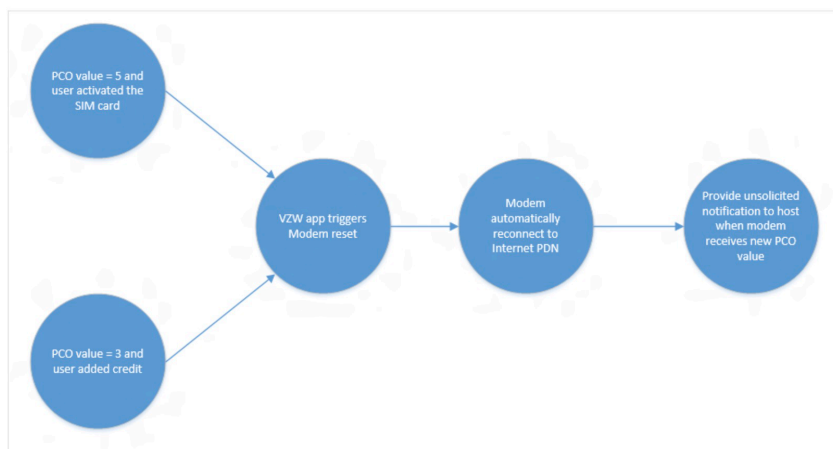
## Resetting the modem based on PCO values

Based on PCO values received from the network, the modem will be reset in the following scenarios:

- The user completed self-activation after receiving PCO = 5 from the network. A new PCO value (3, 0 or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.
- The user added more credit to their account after receiving PCO = 3. A new PCO value (0, or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.

The host is not aware of the modem being reset, so the activated connections from the host will not be deactivated and the modem should automatically re-establish connection with those PDN after resetting. Upon establishing connection and receiving a new incoming PCO value from the network, the modem will provide an unsolicited `NDIS_STATUS_WWAN_PCO_STATUS` notification to the host.

The following diagram illustrates the modem's reset flow when one of these scenarios occurs, with Verizon Wireless as the example MO:



<https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations>

[1c] in response to determining that the particular service policy setting needs to be modified, sending configuration information to the wireless end-user device over the service control link, the configuration information configured to

The Accused Instrumentalities comprise receiving a report comprising device service states “in response to determining that the particular service policy setting needs to be modified, sending configuration information to the wireless end-user device over the service control link, the configuration information configured to assist in modifying or allowing modifications to the particular service policy setting.” Verizon’s network makes determinations that particular service policies for user devices need to be changed when, for example, a subscriber’s service

assist in modifying or allowing modifications to the particular service policy setting.

plan is changed or service-related options are activated or deactivated (e.g., the “Data Boost” option).

On information and belief, the Accused Instrumentalities specifically transmit traffic control-related instructions to mobile devices in the wireless access network based on type of traffic, type of subscriber plan, and priority levels for types of data and/or subscriber account type based on the Accused Instrumentalities’ inspection of traffic to and from the device and the account associated with the device. *See, e.g.,*

### Resetting the modem based on PCO values


Based on PCO values received from the network, the modem will be reset in the following scenarios:

- The user completed self-activation after receiving PCO = 5 from the network. A new PCO value (3, 0 or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.
- The user added more credit to their account after receiving PCO = 3. A new PCO value (0, or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.

The host is not aware of the modem being reset, so the activated connections from the host will not be deactivated and the modem should automatically re-establish connection with those PDN after resetting. Upon establishing connection and receiving a new incoming PCO value from the network, the modem will provide an unsolicited `NDIS_STATUS_WWAN_PCO_STATUS` notification to the host.

The following diagram illustrates the modem’s reset flow when one of these scenarios occurs, with Verizon Wireless as the example MO:



|   |  |
|---|--|
|   | <p><a href="https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations">https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations</a><br/>; <a href="https://source.android.com/docs/core/connect/carrier">https://source.android.com/docs/core/connect/carrier</a></p> <h2>Carrier Configuration </h2> <p>Android 6.0 and higher include a capability for privileged apps to provide carrier-specific configuration to the platform. This functionality, based on the <a href="#">UICC Carrier Privileges</a> introduced in Android 5.1 (Lollipop MR1), allows carrier configuration to be moved away from the static configuration overlays and gives carriers and OEMs the ability to dynamically provide carrier configuration to the platform through a defined interface.</p> <p>A properly signed carrier app can either be preloaded in the system image, installed automatically, or manually installed through an app store. The app is queried by the platform to provide configuration for settings including:</p> <ul style="list-style-type: none"><li>• Roaming/nonroaming networks</li><li>• Visual voicemail</li><li>• SMS/MMS network settings</li><li>• VoLTE/IMS configurations</li></ul> <p>★ <b>Note:</b> This app must be signed with the certificate that has a matching signature to one on the SIM. See <a href="#">How is privilege granted to a carrier app</a> for details.</p> |
| 2. The method of claim 1, wherein the particular service policy setting assists in implementing a roaming control, a parental control, or an enterprise wireless wide-area network (WWAN) management control. | The Accused Instrumentalities comprise the particular service policy setting assists in implementing a roaming control. On information and belief, the protocol configuration options information assists in modifying the service policy setting which controls cellular communications, including when the mobile device is roaming. <i>See, e.g.:</i>   |



## Carrier Configuration

Android 6.0 and higher include a capability for privileged apps to provide carrier-specific configuration to the platform. This functionality, based on the [UICC Carrier Privileges](#) introduced in Android 5.1 (Lollipop MR1), allows carrier configuration to be moved away from the static configuration overlays and gives carriers and OEMs the ability to dynamically provide carrier configuration to the platform through a defined interface.

A properly signed carrier app can either be preloaded in the system image, installed automatically, or manually installed through an app store. The app is queried by the platform to provide configuration for settings including:

- Roaming/nonroaming networks
- Visual voicemail
- SMS/MMS network settings
- VoLTE/IMS configurations

★ **Note:** This app must be signed with the certificate that has a matching signature to one on the SIM. See [How is privilege granted to a carrier app](#) for details.

<https://source.android.com/docs/core/connect/carrier>

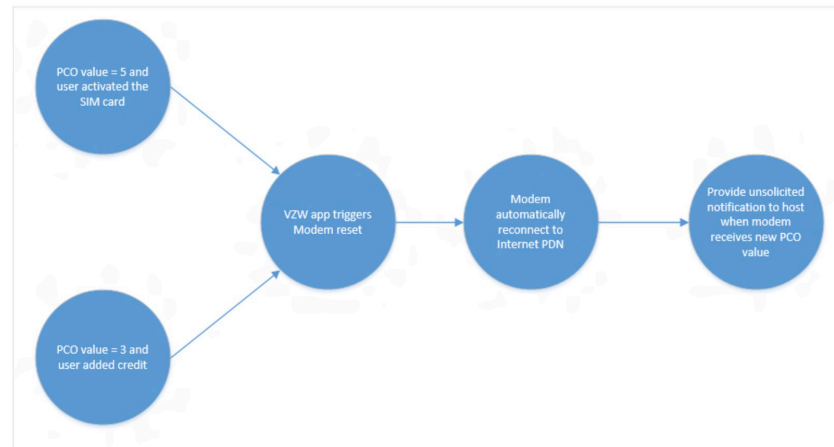
## Resetting the modem based on PCO values

Based on PCO values received from the network, the modem will be reset in the following scenarios:

- The user completed self-activation after receiving PCO = 5 from the network. A new PCO value (3, 0 or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.
- The user added more credit to their account after receiving PCO = 3. A new PCO value (0, or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.

The host is not aware of the modem being reset, so the activated connections from the host will not be deactivated and the modem should automatically re-establish connection with those PDN after resetting. Upon establishing connection and receiving a new incoming PCO value from the network, the modem will provide an unsolicited `NDIS_STATUS_WWAN_PCO_STATUS` notification to the host.

The following diagram illustrates the modem's reset flow when one of these scenarios occurs, with Verizon Wireless as the example MO:



<https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations>

The Accused Instrumentalities comprise the particular service policy setting assists in implementing an enterprise wireless wide-area network (WWAN) management control. On information and belief, the protocol configuration options information assists in modifying the service policy setting which controls cellular communications, including when the mobile device is used in an enterprise. *See, e.g.:*

<https://www.verizon.com/business/products/security/mobile-device-endpoint-security/mobile-device-management/mdm-device-enrollment-programs/>:

PersonalBusiness

Support

✓

MobileInternetSolutionsResourcesContact UsWhy Verizon

Log In


Business / Products / Security & Protection / Mobile Device & Endpoint Security / Mobile Device Management / MDM Device Enrollment Programs

Call Sales: 1.844.994.3147

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The Accused Instrumentalities comprise the particular service policy setting assists in implementing parental controls. On information and belief, the protocol configuration options information assists in modifying the service policy setting which controls cellular communications, including when the mobile device is used in a family account. *See, e.g.:*

<https://www.verizon.com/solutions-and-services/add-ons/safety/verizon-smart-family:>

Personal

Business

Looking for Business? X

✓

Shop

Why Verizon

Support

Sign in

Have a phone you love? Get up to \$540 when you [bring your phone](#). OR Get iPhone 14 Pro or iPhone 14 on us. Online only. With Unlimited Ultimate. [Shop now](#) [Offer De](#)

Verizon Smart Family


Overview


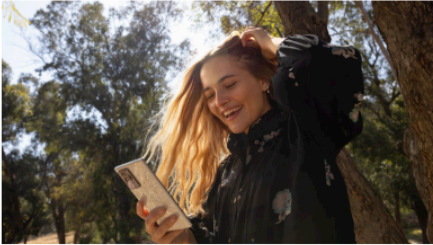




Features

Pricing

Support


Peace of mind  
for you.  
Freedom for  
them.



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|  | <div><div><p><b>Block it Out</b></p><p>Keep certain apps and sites blocked until your kid is ready.</p></div><div><p><b>Trusted contacts only</b></p><p>Make sure they're only texting and chatting with contacts you've approved. Learn more about setting Trusted Contacts by visiting: <a href="https://www.verizon.com/support/how-to-use-verizon-smart-family/">https://www.verizon.com/support/how-to-use-verizon-smart-family/</a></p></div><div><p><b>Cut back screen time</b></p><p>Turn off the web during school or dinner time so they can focus on what matters most.</p></div><div><p><b>Know where they are</b></p><p>Location tracking keeps tabs on your child's phone and sends alerts when they arrive at their destination.</p></div><div><p><b>Pick me up</b></p><p>Kids can request and share location with their parents.</p></div><div><p><b>View their driving and passenger activity</b></p><p>Keep your mind at ease whether on the bus, carpooling or driving.</p></div><p><a href="https://www.verizon.com/support/knowledge-base-206963/">https://www.verizon.com/support/knowledge-base-206963/</a>;<br/><a href="https://www.verizon.com/support/knowledge-base-152696/">https://www.verizon.com/support/knowledge-base-152696/</a>;<br/><a href="https://www.verizon.com/support/verizon-smart-family-faqs/">https://www.verizon.com/support/verizon-smart-family-faqs/</a>;</p></div> |
| <p>3. The method of claim 1, wherein the wireless end-user device is an intermediate networking device for forwarding traffic between a wireless</p> | <p>The Accused Instrumentalities comprise sending configuration information to the wireless end-user device wherein the wireless end-user device is an intermediate networking device for forwarding traffic between a wireless wide-area network (WWAN) and a wireless local-area network (WLAN).</p>  |

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| <p>wide-area network (WWAN) and a wireless local-area network (WLAN).</p> | <p>Mobile devices such as phones, tablets, and hotspot access points which communicate with the Verizon wireless service network (a wireless wide-area network (WWAN)) and have a mobile hotspot feature are intermediate networking devices that forward traffic between Verizon's network (WWAN) and a local WiFi network (WLAN).</p> <p><a href="https://www.verizon.com/articles/wifi-hotspot-service-data-plans/how-to-use-your-smartphone-as-a-mobile-hotspot/">https://www.verizon.com/articles/wifi-hotspot-service-data-plans/how-to-use-your-smartphone-as-a-mobile-hotspot/</a> ("Many of our monthly phone plans and certain prepaid plans let you use Mobile Hotspot on capable devices for no additional monthly charge. When a device is connected to your phone's Mobile Hotspot feature or app, data usage is applied to your data plan's monthly allowance. After exceeding your plan's monthly high-speed allowance, depending on the plan, you have a few options available. You can move to a plan with a higher monthly hotspot data allowance, purchase Data Boost for \$35 for an additional 5GB, or continue to use your mobile hotspot at a lower speed. To learn more about the Mobile Hotspot data offerings that come with our Unlimited plans, check out the available perks with myPlan. Once you've determined if your plan has mobile hotspot capabilities, you can then focus on turning on your smartphone's mobile hotspot functionality. Many smartphones and tablets have a built-in Mobile Hotspot feature that you can access in your device's Settings or the App menu. The feature may have a different name on your device (e.g., Personal Hotspot [iOS], Internet Sharing [Windows®] or Portable Wi-Fi Hotspot [Google™ Nexus devices]), but they do the same thing. Turn your mobile hotspot on using these features in settings, and viola! Your device should be able to find your mobile hotspot network and be able to connect from there.").</p> <p><a href="https://www.verizon.com/support/mobile-hotspot-faqs/">https://www.verizon.com/support/mobile-hotspot-faqs/</a></p> |
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|  | <div data-bbox="705 188 1520 227" data-label="Section-Header"> <h3>Will I be charged to use my Mobile Hotspot feature or app? </h3> </div> <div data-bbox="705 274 1841 339" data-label="Text"> <p>Many of our <a href="#">monthly phone plans</a> and certain <a href="#">prepaid plans</a> let you use 5G Ultra Wideband, 5G and 4G LTE Mobile Hotspot on capable devices for no additional monthly charge.</p> </div> <div data-bbox="705 371 1862 466" data-label="Text"> <p>When a device is connected to your phone's Mobile Hotspot feature or app, data usage is applied to your mobile plan's monthly allowance. After your plan's monthly high-speed allowance is used up, you can still use Hotspot at lower speeds for the rest of the month.*</p> </div> <div data-bbox="705 500 1822 563" data-label="Text"> <p>Visit My Verizon to view your <a href="#">monthly mobile plan</a> or <a href="#">Prepaid plan's</a> Mobile Hotspot allowance feature allowance. Or learn how to <a href="#">get more hotspot data</a> when you need it.</p> </div> <div data-bbox="705 596 777 625" data-label="Text"> <p>Note:</p> </div> <div data-bbox="695 659 1856 823" data-label="List-Group"> <ul style="list-style-type: none"> <li>• 60 GB Mobile Hotspot is included with <a href="#">Unlimited Ultimate</a>.</li> <li>• 30 GB Mobile Hotspot is included with <a href="#">Unlimited Plus</a>.</li> <li>• You can also buy an extra 100 GB/month Mobile Hotspot for \$10/month with <a href="#">Unlimited Welcome</a>.**</li> </ul> </div> <div data-bbox="705 920 1837 1015" data-label="Text"> <p>*Upon full usage of Mobile Hotspot allowance, Mobile Hotspot speeds will be reduced to up to 3 Mbps when on 5G Ultra Wideband and 600 Kbps when on 5G / 4G LTE for the remainder of your monthly billing cycle.</p> </div> <div data-bbox="705 1018 1843 1079" data-label="Text"> <p>**Not available with Welcome Unlimited. You can <a href="#">change to Unlimited Welcome</a> and add this perk in My Verizon.</p> </div> |
| <p>4. The method of claim 1, wherein the wireless end-user device is an intermediate networking device comprising a cellular device, the intermediate networking device for forwarding traffic between the wireless access network and a second network.</p> | <p>The Accused Instrumentalities comprise sending configuration information to the wireless end-user device wherein the wireless end-user device is an intermediate networking device comprising a cellular device, the intermediate networking device for forwarding traffic between the wireless access network and a second network.</p> <p>Mobile devices such as phones, tablets, and hotspot access points (cellular devices) which communicate with the Verizon wireless service network (a wireless wide-area network (WWAN)) and have a mobile hotspot feature are intermediate networking devices that forward traffic between Verizon's network (WWAN) and a local WiFi network (WLAN).</p>   |

<https://www.verizon.com/articles/wifi-hotspot-service-data-plans/how-to-use-your-smartphone-as-a-mobile-hotspot/> (“Many of our monthly phone plans and certain prepaid plans let you use Mobile Hotspot on capable devices for no additional monthly charge. When a device is connected to your phone’s Mobile Hotspot feature or app, data usage is applied to your data plan’s monthly allowance. After exceeding your plan’s monthly high-speed allowance, depending on the plan, you have a few options available. You can move to a plan with a higher monthly hotspot data allowance, purchase Data Boost for \$35 for an additional 5GB, or continue to use your mobile hotspot at a lower speed. To learn more about the Mobile Hotspot data offerings that come with our Unlimited plans, check out the available perks with myPlan. Once you’ve determined if your plan has mobile hotspot capabilities, you can then focus on turning on your smartphone’s mobile hotspot functionality. Many smartphones and tablets have a built-in Mobile Hotspot feature that you can access in your device’s Settings or the App menu. The feature may have a different name on your device (e.g., Personal Hotspot [iOS], Internet Sharing [Windows®] or Portable Wi-Fi Hotspot [Google™ Nexus devices]), but they do the same thing. Turn your mobile hotspot on using these features in settings, and viola! Your device should be able to find your mobile hotspot network and be able to connect from there.”).

<https://www.verizon.com/support/mobile-hotspot-faqs/>



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|  | <div data-bbox="703 188 1520 227">Will I be charged to use my Mobile Hotspot feature or app? </div> <p data-bbox="703 276 1839 339">Many of our <a href="#">monthly phone plans</a> and certain <a href="#">prepaid plans</a> let you use 5G Ultra Wideband, 5G and 4G LTE Mobile Hotspot on capable devices for no additional monthly charge.</p> <p data-bbox="703 375 1860 467">When a device is connected to your phone's Mobile Hotspot feature or app, data usage is applied to your mobile plan's monthly allowance. After your plan's monthly high-speed allowance is used up, you can still use Hotspot at lower speeds for the rest of the month.*</p> <p data-bbox="703 503 1818 566">Visit My Verizon to view your <a href="#">monthly mobile plan</a> or <a href="#">Prepaid plan's</a> Mobile Hotspot allowance feature allowance. Or learn how to <a href="#">get more hotspot data</a> when you need it.</p> <p data-bbox="703 602 777 626">Note:</p> <ul data-bbox="703 662 1850 824" style="list-style-type: none"> <li>• 60 GB Mobile Hotspot is included with <a href="#">Unlimited Ultimate</a>.</li> <li>• 30 GB Mobile Hotspot is included with <a href="#">Unlimited Plus</a>.</li> <li>• You can also buy an extra 100 GB/month Mobile Hotspot for \$10/month with <a href="#">Unlimited Welcome</a>.**</li> </ul> <p data-bbox="703 925 1833 1018">*Upon full usage of Mobile Hotspot allowance, Mobile Hotspot speeds will be reduced to up to 3 Mbps when on 5G Ultra Wideband and 600 Kbps when on 5G / 4G LTE for the remainder of your monthly billing cycle.</p> <p data-bbox="703 1021 1839 1084">**Not available with Welcome Unlimited. You can <a href="#">change to Unlimited Welcome</a> and add this perk in My Verizon.</p> |
| <p data-bbox="105 1136 630 1417">5. The method of claim 1, wherein the wireless end-user device is an intermediate networking device, and the particular service policy setting assists one or more other end-user devices in communicating over the wireless access network via the intermediate networking device.</p> | <p data-bbox="669 1136 1885 1313">The Accused Instrumentalities comprise sending configuration information to the wireless end-user device wherein the wireless end-user device is an intermediate networking device, and the particular service policy setting assists one or more other end-user devices in communicating over the wireless access network via the intermediate networking device. <i>See</i> claim 4; <i>see also</i>, <i>e.g.</i>:</p>   |

## Carrier Configuration

Android 6.0 and higher include a capability for privileged apps to provide carrier-specific configuration to the platform. This functionality, based on the [UICC Carrier Privileges](#) introduced in Android 5.1 (Lollipop MR1), allows carrier configuration to be moved away from the static configuration overlays and gives carriers and OEMs the ability to dynamically provide carrier configuration to the platform through a defined interface.

A properly signed carrier app can either be preloaded in the system image, installed automatically, or manually installed through an app store. The app is queried by the platform to provide configuration for settings including:

- Roaming/nonroaming networks
- Visual voicemail
- SMS/MMS network settings
- VoLTE/IMS configurations

★ **Note:** This app must be signed with the certificate that has a matching signature to one on the SIM. See [How is privilege granted to a carrier app](#) for details.

<https://source.android.com/docs/core/connect/carrier>

## Resetting the modem based on PCO values

Based on PCO values received from the network, the modem will be reset in the following scenarios:

- The user completed self-activation after receiving PCO = 5 from the network. A new PCO value (3, 0 or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.
- The user added more credit to their account after receiving PCO = 3. A new PCO value (0, or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.

The host is not aware of the modem being reset, so the activated connections from the host will not be deactivated and the modem should automatically re-establish connection with those PDN after resetting. Upon establishing connection and receiving a new incoming PCO value from the network, the modem will provide an unsolicited `NDIS_STATUS_WWAN_PCO_STATUS` notification to the host.

The following diagram illustrates the modem's reset flow when one of these scenarios occurs, with Verizon Wireless as the example MO:





<https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations>

As another example, the Accused Instrumentalities comprise sending configuration information to the wireless end-user device wherein the wireless end-user device is an intermediate networking device, and the particular service policy setting assists one or more other end-user devices in communicating over the wireless access network via the intermediate networking device. *See* claim 4; *see also, e.g.*: <https://support.apple.com/en-us/HT204562>:

## About Bluetooth, Wi-Fi, and cellular on your Apple Watch

Learn about Bluetooth and Wi-Fi for your Apple Watch and how your watch uses both. And learn how cellular on GPS + Cellular models fits in.








To enjoy every feature on your Apple Watch, you need to turn on Wi-Fi and Bluetooth on your [paired iPhone](#). [Open Control Center](#) on your iPhone, then make sure that Wi-Fi  and Bluetooth  are on.

Your Apple Watch uses Wi-Fi and Bluetooth to communicate with your paired iPhone. If you have cellular, your watch can also stay connected through a cellular network. Your watch switches between these intelligently to choose the most power-efficient connection. Here's how:

- Your Apple Watch uses Bluetooth when your iPhone is near, which conserves power.
- If Bluetooth isn't available, your Apple Watch will try to use Wi-Fi. For example, if [compatible Wi-Fi](#) is available and your iPhone isn't in Bluetooth range, your Apple Watch uses Wi-Fi.
- If Bluetooth and Wi-Fi aren't available, and you set up a cellular plan, cellular models of Apple Watch can connect to cellular networks.

; <https://www.verizon.com/support/knowledge-base-301365/>:

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|   | <div><div><div><div>PersonalBusiness</div><div>StoresEspañol</div></div><div><div></div><div>ShopWhy VerizonSupport</div><div>Sign inSearch</div></div><div>Have a phone you love? Get up to \$540 when you <a href="#">bring your phone</a>. OR Get iPhone 14 Pro or iPhone 14 on us. Online only. With Unlimited Ultimate. <a href="#">Shop now</a>   <a href="#">Offer Details</a></div><div>Support &gt; Samsung &gt; Samsung Galaxy Watch 42mm</div><div><h2>Samsung Galaxy Watch - Add Cellular Plan</h2><div>Was this helpful?  </div><div><div><b>NOTE</b><br/>Before you begin, ensure:</div><div><ul style="list-style-type: none"><li>your Galaxy Watch has been paired with an Android™ smartphone or Apple® iPhone®.<br/>→ Refer to <a href="#">Connect to New Phone</a> for assistance.</li><li>your companion phone has a cellular connection.<br/>→ If activating with Number Share, the companion smartphone must be connected to active Verizon service on the same account as the Galaxy Watch.</li><li>your Galaxy Watch is <a href="#">charged</a> and powered on.</li></ul></div></div><div><div>Add Cellular Plan via Android Smartphone</div><div></div></div><div><div>Add Cellular Plan via Apple iPhone</div><div></div></div></div></div></div> |
| 6. The method of claim 1, further comprising: obtaining a service usage measure, the service usage measure accounting for the one or more communications associated with the wireless end-user device over the wireless access network; and based on the service usage measure, taking an action. | <p>The Accused Instrumentalities comprise obtaining a service usage measure that includes a measure of service usage activity, the service usage measure accounting for the one or more communications associated with the wireless end-user device over the wireless access network; and based on the service usage measure, taking an action.</p> <p>On information and belief, the Accused Instrumentalities obtain a service usage measure accounting for communications associated with the mobile device over Verizon’s wireless access network, including a measure of service usage activity such as information indicating overall cellular data usage and mobile hotspot data usage for the service period. Based on the service usage measure, the Accused Instrumentalities take an action such as sending configuration information that modifies a policy setting to allow, block or throttle cellular data usage or mobile hotspot data usage.</p>  |

See claim 1.

See also, e.g., <https://www.verizon.com/about/news/verizon-wireless-makes-it-easy-for-customers-to-monitor>:

**Check the usage meter in My Verizon or the My Verizon App**

This tool lets you monitor your usage online from your computer. It's a great way to quickly see how much you've used and how much of your monthly data allowance you have left. If you have an unlimited size\* of the new Verizon Plan, you can also see how much Mobile Hotspot data you have left on each line.

The round usage data meter is in the My Usage section of My Verizon, and shows your data usage and days remaining in your current bill cycle. The page also shows your minutes and messaging, if applicable. Refer to these often to track how your usage compares to the limits in your plan.

If you're not near a computer, you can view the usage meters in My Verizon on your smartphone or tablet's web browser. If you have a compatible device, you can download and use the My Verizon app. Visit the My Verizon app page to download the app and learn more.

; <https://www.verizon.com/support/knowledge-base-205730/>:

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|   | <div><div><div>PersonalBusiness</div><div>StoresEspañol</div></div><div><div>✓</div><div>ShopWhy VerizonSupport</div><div>Sign in🛒Search</div></div><div>Have a phone you love? Get up to \$540 when you <a href="#">bring your phone</a>. OR Get iPhone 14 Pro or iPhone 14 on us. Online only. With Unlimited Ultimate. <a href="#">Shop now</a>   <a href="#">Offer Details</a></div><div>Support &gt; <a href="#">Services &amp; Apps</a> &gt; <a href="#">My Verizon</a></div><div><h2>My Verizon app - View Data Usage</h2><div><div><div>NOTE</div><div><ul style="list-style-type: none"><li>Ensure your app is <u>up to date</u> as the following steps apply to the most recent version.</li><li>The My Verizon app is only available for Android™ devices running 5.0 or higher and Apple® iOS devices running 11.0 or higher. For all other devices, visit the <a href="#">My Verizon website</a> to manage your account.</li><li>Available settings vary based on <u>user type</u> (e.g., Account Owner, Account Manager, Account Member) and plan.</li></ul></div></div><div><div>Was this helpful?</div><div>👍👎</div></div><div><div>View Unbilled Usage</div><div>+</div></div><div><div>View International Usage</div><div>+</div></div><div><div>View Bonus, Carryover, Gifted, Data Boost, and Plan Data</div><div>+</div></div><div><div>View Data History</div><div>+</div></div></div></div></div> |
| <p>7. The method of claim 6, wherein the service usage measure comprises a measure of a service usage activity.</p> | <p>The Accused Instrumentalities comprise obtaining a service usage measure that includes a measure of service usage activity, the service usage measure accounting for the one or more communications associated with the wireless end-user device over the wireless access network; and based on the service usage measure, taking an action. On information and belief, the Accused Instrumentalities obtain a service usage measure accounting for communications associated with the mobile device over Verizon’s wireless access network, including a measure of service usage activity such as information indicating overall cellular data usage and mobile hotspot data usage for the service period. Based on the service usage measure, the Accused Instrumentalities take an action such as sending configuration information that modifies a policy setting to allow, block or throttle cellular data usage or mobile hotspot data usage.</p> <p><i>See claim 6.</i></p>  |



|   |   |
|---|---|
| <p>8. The method of claim 6, wherein the action is to verify the service usage measure.</p>                   | <p>The Accused Instrumentalities comprise obtaining a service usage measure that includes a measure of service usage activity, the service usage measure accounting for the one or more communications associated with the wireless end-user device over the wireless access network; and based on the service usage measure, taking an action, wherein the action is to verify the service usage measure. On information and belief, based on the service usage measure indicating overall cellular data usage and mobile hotspot data usage for the service period, the Accused Instrumentalities verify the service usage measure to ensure that it accounts for the actual service usage of the mobile device.</p> <p><i>See claim 6.</i></p>   |
| <p>9. The method of claim 6, wherein the action is to quarantine or suspend the wireless end-user device.</p> | <p>The Accused Instrumentalities comprise obtaining a service usage measure, the service usage measure accounting for the one or more communications associated with the wireless end-user device over the wireless access network; and based on the service usage measure, taking an action to quarantine or suspend the wireless end-user device. On information and belief, the Accused Instrumentalities obtain a service usage measure indicating a prohibited service usage activity under Verizon's Acceptable Use Policy, and based on the service measure, quarantine or suspend the mobile device.</p> <p><b>1. General Policy:</b> Verizon reserves the sole discretion to deny or restrict your Service, or immediately to suspend or terminate your Service, if the use of your Service by you or anyone using it, in our sole discretion, violates the Agreement or other Verizon policies, is objectionable or unlawful, interferes with the functioning or use of the Internet or the Verizon network by Verizon or other users, or violates the terms of this Acceptable Use Policy ("AUP").</p> <p><b>2. Specific Examples of AUP Violations.</b> The following are examples of conduct which may lead to termination of your Service. Without limiting the general policy in Section 1, it is a violation of the Agreement and this AUP to: (a) access without permission or right the accounts or computer systems of others, to spoof the URL, DNS or IP addresses of Verizon or any other entity, or to penetrate the security measures of Verizon or any other person's computer system, or to attempt any of the foregoing; (b) transmit uninvited communications, data or information, or engage in other similar activities, including without limitation, "spamming", "flaming" or denial of service attacks; (c) intercept, interfere with or redirect email or other transmissions sent by or to others; (d) introduce viruses, worms, harmful code or Trojan horses on the Internet; (e) post off-topic information on message boards, chat rooms or social networking sites; (f) engage in conduct that is defamatory, fraudulent, obscene or deceptive; (g) violate Verizon's or any third party's copyright, trademark, proprietary or other intellectual property rights; (h) engage in any conduct harmful to the Verizon network, the Internet generally or other Internet users; (i) generate excessive amounts of email or other Internet traffic; (j) use the Service to violate any rule, policy or guideline of Verizon; (k) use the service in any fashion for the transmission or dissemination of images containing child pornography or in a manner that is obscene, sexually explicit, cruel or racist in nature or which espouses, promotes or incites bigotry, hatred or racism; or (l) download or use the Service in Cuba, Iran, North Korea, Sudan and Syria or to destinations that are otherwise controlled or embargoed under U.S. law, as modified from time to time by the Departments of Treasury and Commerce.</p> <p><a href="https://www.verizon.com/about/terms-conditions/acceptable-use-policy">https://www.verizon.com/about/terms-conditions/acceptable-use-policy</a></p> |



|  |  |
|--|--|
| <p>12. The method of claim 1, wherein the configuration information comprises at least a portion of the service profile.</p> | <p>The Accused Instrumentalities comprise sending the configuration information, wherein the configuration information comprises a portion of the service profile stored in an encrypted partition of the device or in an encrypted SIM card.</p> <p><i>See claim 1.</i></p>   |
| <p>13. The method of claim 1, wherein the service control link is secured by an encryption protocol.</p>                     | <p>The Accused Instrumentalities comprise sending configuration information over the service control link, wherein the service control link is secured by an encryption protocol.</p> <p><b>4.4.4 Integrity protection of NAS signalling messages</b></p> <p><b>4.4.4.1 General</b></p> <p>For the UE, integrity protected signalling is mandatory for the NAS messages once a valid EPS security context exists and has been taken into use. For the network, integrity protected signalling is mandatory for the NAS messages once a secure exchange of NAS messages has been established for the NAS signalling connection. Integrity protection of all NAS signalling messages is the responsibility of the NAS. It is the network which activates integrity protection.</p> <p><b>4.4.4.3 Integrity checking of NAS signalling messages in the MME</b></p> <p>Except the messages listed below, no NAS signalling messages shall be processed by the receiving EMM entity in the MME or forwarded to the ESM entity, unless the secure exchange of NAS messages has been established for the NAS signalling connection:</p> <ul style="list-style-type: none"><li>- EMM messages:</li><li>- ATTACH REQUEST;</li></ul> |

### 6.1.1 General

This clause describes the procedures used for EPS session management (ESM) at the radio interface (reference point "LTE-Uu").

The main function of the ESM sublayer is to support the EPS bearer context handling in the UE and in the MME.

The ESM comprises procedures for:

- the activation, deactivation and modification of EPS bearer contexts;
- the request for resources (IP connectivity to a PDN or dedicated bearer resources) by the UE; and
- the transport of user data via the control plane between the UE and the MME.

Each EPS bearer context represents an EPS bearer between the UE and a PDN. EPS bearer contexts can remain activated even if the radio and S1 bearers constituting the corresponding EPS bearers between UE and MME are temporarily released.

An EPS bearer context can be either a default bearer context or a dedicated bearer context.

A default EPS bearer context is activated when the UE requests a connection to a PDN.

Generally, ESM procedures can be performed only if an EMM context has been established between the UE and the MME, and the secure exchange of NAS messages has been initiated by the MME by use of the EMM procedures described in clause 5. The first default EPS bearer context, however, can be activated during the EPS attach procedure (see subclause 4.2). Once the UE is successfully attached, and the first default EPS bearer context has been activated during or after the attach procedure, the UE can request the MME to set up connections to additional PDNs. For each additional connection, the MME will activate a separate default EPS bearer context. A default EPS bearer context remains activated throughout the lifetime of the connection to the PDN.

### 6.1.2 Types of ESM procedures

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|   |  |
|---|--|
|   | <p>2) Transaction related procedures:</p> <p>These procedures are initiated by the UE to request for resources, i.e. a new PDN connection or dedicated bearer resources, or to release these resources:</p> <ul style="list-style-type: none"><li>- PDN connectivity procedure;</li><li>- PDN disconnect procedure;</li><li>- bearer resource allocation procedure;</li><li>- bearer resource modification procedure.</li></ul> <p>3GPP TS 24.301 v15.03</p> |
| 14. The method of claim 1, wherein the device service state comprises a service profile setting, a service usage policy setting, or a device-assisted services (DAS) setting. | <p>The Accused Instrumentalities comprise receiving, over a service control link, a report from a wireless end-user device, the report comprising information about a device service state, wherein the device service state comprises a service profile setting, a service usage policy setting, or a device-assisted services (DAS) setting. <i>See, e.g.:</i></p>   |

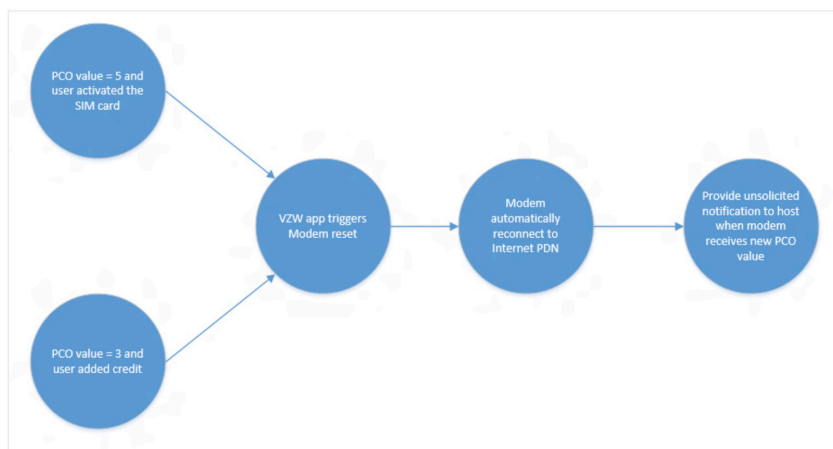
## Resetting the modem based on PCO values

Based on PCO values received from the network, the modem will be reset in the following scenarios:

- The user completed self-activation after receiving PCO = 5 from the network. A new PCO value (3, 0 or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.
- The user added more credit to their account after receiving PCO = 3. A new PCO value (0, or anything Mobile Operator App can recognize) will be sent to the OS and the OS will pass it to Mobile Operator App.

The host is not aware of the modem being reset, so the activated connections from the host will not be deactivated and the modem should automatically re-establish connection with those PDN after resetting. Upon establishing connection and receiving a new incoming PCO value from the network, the modem will provide an unsolicited `NDIS_STATUS_WWAN_PCO_STATUS` notification to the host.

The following diagram illustrates the modem's reset flow when one of these scenarios occurs, with Verizon Wireless as the example MO:



<https://learn.microsoft.com/en-us/windows-hardware/drivers/network/mb-protocol-configuration-options-pco-operations>

16. The method of claim 1, wherein the device service state comprises information associated with an encryption key.

The Accused Instrumentalities comprise receiving, over a service control link, a report from a wireless end-user device, the report comprising information about a device service state, wherein the device service state comprises information associated with an encryption key. *See, e.g.:*

Table 8.2.4.1: ATTACH REQUEST message content

| IEI | Information Element                            | Type/Reference   | Presence | Format | Length |
|-----|--|--|----------|--------|--------|
|     | Protocol discriminator                         | Protocol discriminator<br>9.2                              | M        | V      | 1/2    |
|     | Security header type                           | Security header type<br>9.3.1                              | M        | V      | 1/2    |
|     | Attach request message identity                | Message type<br>9.8  | M        | V      | 1      |
|     | EPS attach type                                | EPS attach type<br>9.9.3.11                                | M        | V      | 1/2    |
|     | NAS key set identifier                         | NAS key set identifier<br>9.9.3.21                         | M        | V      | 1/2    |
|     | EPS mobile identity                            | EPS mobile identity<br>9.9.3.12                            | M        | LV     | 5-12   |
|     | UE network capability                          | UE network capability<br>9.9.3.34                          | M        | LV     | 3-14   |
|     | ESM message container                          | ESM message container<br>9.9.3.15                          | M        | LV-E   | 5-n    |
| 19  | Old P-TMSI signature                           | P-TMSI signature<br>9.9.3.26                               | O        | TV     | 4      |
| 50  | Additional GUTI                                | EPS mobile identity<br>9.9.3.12                            | O        | TLV    | 13     |
| 52  | Last visited registered TAI                    | Tracking area identity<br>9.9.3.32                         | O        | TV     | 6      |
| 5C  | DRX parameter                                  | DRX parameter<br>9.9.3.8                                   | O        | TV     | 3      |
| 31  | MS network capability                          | MS network capability<br>9.9.3.20                          | O        | TLV    | 4-10   |
| 13  | Old location area identification               | Location area identification<br>9.9.2.2                    | O        | TV     | 6      |
| 9-  | TMSI status                                    | TMSI status<br>9.9.3.31                                    | O        | TV     | 1      |
| 11  | Mobile station classmark 2                     | Mobile station classmark 2<br>9.9.2.4                      | O        | TLV    | 5      |
| 20  | Mobile station classmark 3                     | Mobile station classmark 3<br>9.9.2.5                      | O        | TLV    | 2-34   |
| 40  | Supported Codecs                               | Supported Codec List<br>9.9.2.10                           | O        | TLV    | 5-n    |
| F-  | Additional update type                         | Additional update type<br>9.9.3.0B                         | O        | TV     | 1      |
| 5D  | Voice domain preference and UE's usage setting | Voice domain preference and UE's usage setting<br>9.9.3.44 | O        | TLV    | 3      |
| D-  | Device properties                              | Device properties<br>9.9.2.0A                              | O        | TV     | 1      |
| E-  | Old GUTI type                                  | GUTI type<br>9.9.3.45                                      | O        | TV     | 1      |
| C-  | MS network feature support                     | MS network feature support<br>9.9.3.20A                    | O        | TV     | 1      |
| 10  | TMSI based NRI container                       | Network resource identifier container<br>9.9.3.24A         | O        | TLV    | 4      |
| 6A  | T3324 value                                    | GPRS timer 2<br>9.9.3.16A                                  | O        | TLV    | 3      |
| 5E  | T3412 extended value                           | GPRS timer 3<br>9.9.3.16B                                  | O        | TLV    | 3      |
| 6E  | Extended DRX parameters                        | Extended DRX parameters<br>9.9.3.46                        | O        | TLV    | 3      |
| 6F  | UE additional security capability              | UE additional security capability<br>9.9.3.53              | O        | TLV    | 6      |
| 6D  | UE status                                      | UE status<br>9.9.3.54                                      | O        | TLV    | 3      |
| 17  | Additional information requested               | Additional information requested<br>9.9.3.55               | O        | TV     | 2      |



**Table 8.3.8.1: BEARER RESOURCE ALLOCATION REQUEST message content**

| IEI | Information Element                                 | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                              | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                 | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                      | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource allocation request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | Linked EPS bearer identity                          | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                    | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                              | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
|     | Required traffic flow QoS                           | EPS quality of service<br>9.9.4.3                   | M        | LV     | 2-14    |
| 27  | Protocol configuration options                      | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                   | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                    | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 7B  | Extended protocol configuration options             | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                    | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

**Table 8.3.10.1: BEARER RESOURCE MODIFICATION REQUEST message content**

| IEI | Information Element                                   | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                                | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                   | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                        | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource modification request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | EPS bearer identity for packet filter                 | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                      | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                                | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
| 5B  | Required traffic flow QoS                             | EPS quality of service<br>9.9.4.3                   | O        | TLV    | 3-15    |
| 58  | ESM cause   | ESM cause<br>9.9.4.4                                | O        | TV     | 2       |
| 27  | Protocol configuration options                        | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                     | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                      | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 66  | Header compression configuration                      | Header compression configuration<br>9.9.4.22        | O        | TLV    | 5-257   |
| 7B  | Extended protocol configuration options               | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                      | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

|  |  |   |                |          |        |         |
|--|--|---|----------------|----------|--------|---------|
|  | Table 8.3.20.1: PDN CONNECTIVITY REQUEST message content   |   |                |          |        |         |
|  | IEI  | Information Element                       | Type/Reference | Presence | Format | Length  |
|  |  | Protocol discriminator                    | 9.2            | M        | V      | 1/2     |
|  |  | EPS bearer identity                       | 9.3.2          | M        | V      | 1/2     |
|  |  | Procedure transaction identity            | 9.4            | M        | V      | 1       |
|  |  | PDN connectivity request message identity | 9.8            | M        | V      | 1       |
|  |  | Request type                              | 9.9.4.14       | M        | V      | 1/2     |
|  |  | PDN type                                  | 9.9.4.10       | M        | V      | 1/2     |
|  | D-   | ESM information transfer flag             | 9.9.4.5        | O        | TV     | 1       |
|  | 28   | Access point name                         | 9.9.4.1        | O        | TLV    | 3-102   |
|  | 27   | Protocol configuration options            | 9.9.4.11       | O        | TLV    | 3-253   |
|  | C-   | Device properties                         | 9.9.2.0A       | O        | TV     | 1       |
|  | 33   | NBIFOM container                          | 9.9.4.19       | O        | TLV    | 3-257   |
|  | 66   | Header compression configuration          | 9.9.4.22       | O        | TLV    | 5-257   |
|  | 7B   | Extended protocol configuration options   | 9.9.4.26       | O        | TLV-E  | 4-65538 |
| 3GPP TS 24.301 v15.03  |  |   |                |          |        |         |
| 17. The method of claim 1, wherein the device service state comprises an agent report, a service usage record, a transaction record, or an integrity report. | The Accused Instrumentalities comprise receiving, over a service control link, a report from a wireless end-user device, the report comprising information about a device service state, wherein the device service state comprises an agent report, a service usage record, a transaction record, or an integrity report. <i>See, e.g.:</i> |   |                |          |        |         |

Table 8.2.4.1: ATTACH REQUEST message content

| IEI | Information Element                            | Type/Reference   | Presence | Format | Length |
|-----|--|--|----------|--------|--------|
|     | Protocol discriminator                         | Protocol discriminator<br>9.2                              | M        | V      | 1/2    |
|     | Security header type                           | Security header type<br>9.3.1                              | M        | V      | 1/2    |
|     | Attach request message identity                | Message type<br>9.8  | M        | V      | 1      |
|     | EPS attach type                                | EPS attach type<br>9.9.3.11                                | M        | V      | 1/2    |
|     | NAS key set identifier                         | NAS key set identifier<br>9.9.3.21                         | M        | V      | 1/2    |
|     | EPS mobile identity                            | EPS mobile identity<br>9.9.3.12                            | M        | LV     | 5-12   |
|     | UE network capability                          | UE network capability<br>9.9.3.34                          | M        | LV     | 3-14   |
|     | ESM message container                          | ESM message container<br>9.9.3.15                          | M        | LV-E   | 5-n    |
| 19  | Old P-TMSI signature                           | P-TMSI signature<br>9.9.3.26                               | O        | TV     | 4      |
| 50  | Additional GUTI                                | EPS mobile identity<br>9.9.3.12                            | O        | TLV    | 13     |
| 52  | Last visited registered TAI                    | Tracking area identity<br>9.9.3.32                         | O        | TV     | 6      |
| 5C  | DRX parameter                                  | DRX parameter<br>9.9.3.8                                   | O        | TV     | 3      |
| 31  | MS network capability                          | MS network capability<br>9.9.3.20                          | O        | TLV    | 4-10   |
| 13  | Old location area identification               | Location area identification<br>9.9.2.2                    | O        | TV     | 6      |
| 9-  | TMSI status                                    | TMSI status<br>9.9.3.31                                    | O        | TV     | 1      |
| 11  | Mobile station classmark 2                     | Mobile station classmark 2<br>9.9.2.4                      | O        | TLV    | 5      |
| 20  | Mobile station classmark 3                     | Mobile station classmark 3<br>9.9.2.5                      | O        | TLV    | 2-34   |
| 40  | Supported Codecs                               | Supported Codec List<br>9.9.2.10                           | O        | TLV    | 5-n    |
| F-  | Additional update type                         | Additional update type<br>9.9.3.0B                         | O        | TV     | 1      |
| 5D  | Voice domain preference and UE's usage setting | Voice domain preference and UE's usage setting<br>9.9.3.44 | O        | TLV    | 3      |
| D-  | Device properties                              | Device properties<br>9.9.2.0A                              | O        | TV     | 1      |
| E-  | Old GUTI type                                  | GUTI type<br>9.9.3.45                                      | O        | TV     | 1      |
| C-  | MS network feature support                     | MS network feature support<br>9.9.3.20A                    | O        | TV     | 1      |
| 10  | TMSI based NRI container                       | Network resource identifier container<br>9.9.3.24A         | O        | TLV    | 4      |
| 6A  | T3324 value                                    | GPRS timer 2<br>9.9.3.16A                                  | O        | TLV    | 3      |
| 5E  | T3412 extended value                           | GPRS timer 3<br>9.9.3.16B                                  | O        | TLV    | 3      |
| 6E  | Extended DRX parameters                        | Extended DRX parameters<br>9.9.3.46                        | O        | TLV    | 3      |
| 6F  | UE additional security capability              | UE additional security capability<br>9.9.3.53              | O        | TLV    | 6      |
| 6D  | UE status                                      | UE status<br>9.9.3.54                                      | O        | TLV    | 3      |
| 17  | Additional information requested               | Additional information requested<br>9.9.3.55               | O        | TV     | 2      |



**Table 8.3.8.1: BEARER RESOURCE ALLOCATION REQUEST message content**

| IEI | Information Element                                 | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                              | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                 | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                      | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource allocation request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | Linked EPS bearer identity                          | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                    | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                              | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
|     | Required traffic flow QoS                           | EPS quality of service<br>9.9.4.3                   | M        | LV     | 2-14    |
| 27  | Protocol configuration options                      | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                   | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                    | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 7B  | Extended protocol configuration options             | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                    | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

**Table 8.3.10.1: BEARER RESOURCE MODIFICATION REQUEST message content**

| IEI | Information Element                                   | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                                | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                   | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                        | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource modification request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | EPS bearer identity for packet filter                 | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                      | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                                | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
| 5B  | Required traffic flow QoS                             | EPS quality of service<br>9.9.4.3                   | O        | TLV    | 3-15    |
| 58  | ESM cause   | ESM cause<br>9.9.4.4                                | O        | TV     | 2       |
| 27  | Protocol configuration options                        | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                     | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                      | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 66  | Header compression configuration                      | Header compression configuration<br>9.9.4.22        | O        | TLV    | 5-257   |
| 7B  | Extended protocol configuration options               | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                      | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

|  |  |   |                |          |        |         |
|--|--|---|----------------|----------|--------|---------|
|  | Table 8.3.20.1: PDN CONNECTIVITY REQUEST message content   |   |                |          |        |         |
|  | IEI  | Information Element                       | Type/Reference | Presence | Format | Length  |
|  |  | Protocol discriminator                    | 9.2            | M        | V      | 1/2     |
|  |  | EPS bearer identity                       | 9.3.2          | M        | V      | 1/2     |
|  |  | Procedure transaction identity            | 9.4            | M        | V      | 1       |
|  |  | PDN connectivity request message identity | 9.8            | M        | V      | 1       |
|  |  | Request type                              | 9.9.4.14       | M        | V      | 1/2     |
|  |  | PDN type                                  | 9.9.4.10       | M        | V      | 1/2     |
|  | D-   | ESM information transfer flag             | 9.9.4.5        | O        | TV     | 1       |
|  | 28   | Access point name                         | 9.9.4.1        | O        | TLV    | 3-102   |
|  | 27   | Protocol configuration options            | 9.9.4.11       | O        | TLV    | 3-253   |
|  | C-   | Device properties                         | 9.9.2.0A       | O        | TV     | 1       |
|  | 33   | NBIFOM container                          | 9.9.4.19       | O        | TLV    | 3-257   |
|  | 66   | Header compression configuration          | 9.9.4.22       | O        | TLV    | 5-257   |
|  | 7B   | Extended protocol configuration options   | 9.9.4.26       | O        | TLV-E  | 4-65538 |
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| 18. The method of claim 1, wherein the device service state comprises user status information, device status information, application status information, a device location, or a device quality-of-service (QOS) state. | The Accused Instrumentalities comprise receiving, over a service control link, a report from a wireless end-user device, the report comprising information about a device service state, wherein the device service state comprises user status information, device status information, application status information, a device location, or a device quality-of-service (QOS) state. <i>See, e.g.:</i> |   |                |          |        |         |

Table 8.2.4.1: ATTACH REQUEST message content

| IEI | Information Element                            | Type/Reference   | Presence | Format | Length |
|-----|--|--|----------|--------|--------|
|     | Protocol discriminator                         | Protocol discriminator<br>9.2                              | M        | V      | 1/2    |
|     | Security header type                           | Security header type<br>9.3.1                              | M        | V      | 1/2    |
|     | Attach request message identity                | Message type<br>9.8  | M        | V      | 1      |
|     | EPS attach type                                | EPS attach type<br>9.9.3.11                                | M        | V      | 1/2    |
|     | NAS key set identifier                         | NAS key set identifier<br>9.9.3.21                         | M        | V      | 1/2    |
|     | EPS mobile identity                            | EPS mobile identity<br>9.9.3.12                            | M        | LV     | 5-12   |
|     | UE network capability                          | UE network capability<br>9.9.3.34                          | M        | LV     | 3-14   |
|     | ESM message container                          | ESM message container<br>9.9.3.15                          | M        | LV-E   | 5-n    |
| 19  | Old P-TMSI signature                           | P-TMSI signature<br>9.9.3.26                               | O        | TV     | 4      |
| 50  | Additional GUTI                                | EPS mobile identity<br>9.9.3.12                            | O        | TLV    | 13     |
| 52  | Last visited registered TAI                    | Tracking area identity<br>9.9.3.32                         | O        | TV     | 6      |
| 5C  | DRX parameter                                  | DRX parameter<br>9.9.3.8                                   | O        | TV     | 3      |
| 31  | MS network capability                          | MS network capability<br>9.9.3.20                          | O        | TLV    | 4-10   |
| 13  | Old location area identification               | Location area identification<br>9.9.2.2                    | O        | TV     | 6      |
| 9-  | TMSI status                                    | TMSI status<br>9.9.3.31                                    | O        | TV     | 1      |
| 11  | Mobile station classmark 2                     | Mobile station classmark 2<br>9.9.2.4                      | O        | TLV    | 5      |
| 20  | Mobile station classmark 3                     | Mobile station classmark 3<br>9.9.2.5                      | O        | TLV    | 2-34   |
| 40  | Supported Codecs                               | Supported Codec List<br>9.9.2.10                           | O        | TLV    | 5-n    |
| F-  | Additional update type                         | Additional update type<br>9.9.3.0B                         | O        | TV     | 1      |
| 5D  | Voice domain preference and UE's usage setting | Voice domain preference and UE's usage setting<br>9.9.3.44 | O        | TLV    | 3      |
| D-  | Device properties                              | Device properties<br>9.9.2.0A                              | O        | TV     | 1      |
| E-  | Old GUTI type                                  | GUTI type<br>9.9.3.45                                      | O        | TV     | 1      |
| C-  | MS network feature support                     | MS network feature support<br>9.9.3.20A                    | O        | TV     | 1      |
| 10  | TMSI based NRI container                       | Network resource identifier container<br>9.9.3.24A         | O        | TLV    | 4      |
| 6A  | T3324 value                                    | GPRS timer 2<br>9.9.3.16A                                  | O        | TLV    | 3      |
| 5E  | T3412 extended value                           | GPRS timer 3<br>9.9.3.16B                                  | O        | TLV    | 3      |
| 6E  | Extended DRX parameters                        | Extended DRX parameters<br>9.9.3.46                        | O        | TLV    | 3      |
| 6F  | UE additional security capability              | UE additional security capability<br>9.9.3.53              | O        | TLV    | 6      |
| 6D  | UE status                                      | UE status<br>9.9.3.54                                      | O        | TLV    | 3      |
| 17  | Additional information requested               | Additional information requested<br>9.9.3.55               | O        | TV     | 2      |

Table 8.3.8.1: BEARER RESOURCE ALLOCATION REQUEST message content

| IEI | Information Element                                 | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                              | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                 | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                      | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource allocation request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | Linked EPS bearer identity                          | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                    | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                              | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
|     | Required traffic flow QoS                           | EPS quality of service<br>9.9.4.3                   | M        | LV     | 2-14    |
| 27  | Protocol configuration options                      | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                   | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                    | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 7B  | Extended protocol configuration options             | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                    | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

**Table 8.3.10.1: BEARER RESOURCE MODIFICATION REQUEST message content**

| IEI | Information Element                                   | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                                | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                                   | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity                        | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | Bearer resource modification request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | EPS bearer identity for packet filter                 | Linked EPS bearer identity<br>9.9.4.6               | M        | V      | 1/2     |
|     | Spare half octet                                      | Spare half octet<br>9.9.2.9                         | M        | V      | 1/2     |
|     | Traffic flow aggregate                                | Traffic flow aggregate description<br>9.9.4.15      | M        | LV     | 2-256   |
| 5B  | Required traffic flow QoS                             | EPS quality of service<br>9.9.4.3                   | O        | TLV    | 3-15    |
| 58  | ESM cause   | ESM cause<br>9.9.4.4                                | O        | TV     | 2       |
| 27  | Protocol configuration options                        | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                                     | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                                      | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 66  | Header compression configuration                      | Header compression configuration<br>9.9.4.22        | O        | TLV    | 5-257   |
| 7B  | Extended protocol configuration options               | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |
| 5C  | Extended EPS QoS                                      | Extended quality of service<br>9.9.4.30             | O        | TLV    | 12      |

**Table 8.3.20.1: PDN CONNECTIVITY REQUEST message content**

| IEI | Information Element                       | Type/Reference                                      | Presence | Format | Length  |
|-----|---|---|----------|--------|---------|
|     | Protocol discriminator                    | Protocol discriminator<br>9.2                       | M        | V      | 1/2     |
|     | EPS bearer identity                       | EPS bearer identity<br>9.3.2                        | M        | V      | 1/2     |
|     | Procedure transaction identity            | Procedure transaction identity<br>9.4               | M        | V      | 1       |
|     | PDN connectivity request message identity | Message type<br>9.8                                 | M        | V      | 1       |
|     | Request type                              | Request type<br>9.9.4.14                            | M        | V      | 1/2     |
|     | PDN type                                  | PDN type<br>9.9.4.10                                | M        | V      | 1/2     |
| D-  | ESM information transfer flag             | ESM information transfer flag<br>9.9.4.5            | O        | TV     | 1       |
| 28  | Access point name                         | Access point name<br>9.9.4.1                        | O        | TLV    | 3-102   |
| 27  | Protocol configuration options            | Protocol configuration options<br>9.9.4.11          | O        | TLV    | 3-253   |
| C-  | Device properties                         | Device properties<br>9.9.2.0A                       | O        | TV     | 1       |
| 33  | NBIFOM container                          | NBIFOM container<br>9.9.4.19                        | O        | TLV    | 3-257   |
| 66  | Header compression configuration          | Header compression configuration<br>9.9.4.22        | O        | TLV    | 5-257   |
| 7B  | Extended protocol configuration options   | Extended protocol configuration options<br>9.9.4.26 | O        | TLV-E  | 4-65538 |

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